

**BRAZE MICROSTRUCTURE EVOLUTION AND MECHANICAL PROPERTIES OF
ELECTRON BEAM JOINED CERAMICS**

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High strength, hermetic braze joints between ceramic components have been produced using a high energy electron beam. The duration and the beam power were varied during the joining process to study the effects of processing on microstructure and mechanical properties of the joints. Special emphasis was placed on the identification of the allowable operating ranges that produce thermal conditions favorable to robust joining and sealing of alumina using a copper-silver braze with titanium. The microstructure at the ceramic-braze interface is examined by SEM together with EDS analysis to identify the possible bonding mechanisms involved. The phase formation sequence at the interface is explained in terms of the chemical activity of titanium and the microstructure changes in the solidified braze alloys. Microstructural evolution and mechanical strength appear to correlate well with the reaction kinetics involved at the ceramic-braze interface.

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